CLAIMS

What is claimed is:

1. A scroll machine comprising:

a first scroll member having a first spiral wrap projecting outwardly from a first end plate;

a second scroll member having a second spiral wrap projecting outwardly from a second end plate, said second spiral wrap being interleaved with said first spiral wrap;

a drive member for causing said spiral wraps to orbit with respect to one another whereby said spiral wraps create pockets of progressively changing volume between a suction pressure zone at a suction pressure and a discharge pressure zone at a discharge pressure;

a plate member having first and second generally flat portions disposed adjacent said first scroll member;

a discharge passage placing one of said pockets in fluid communication with said discharge pressure zone, said discharge passage extending through said plate member and said first end plate;

a first annular lip seal disposed between said first generally flat portion of said plate member and said first end plate and surrounding said discharge passage;

a second annular lip seal disposed between said second generally flat portion of said plate member and said first end plate and surrounding said

first annual lip seal, thereby defining a chamber between said annular lip seals; and

a passage for placing compressed fluid at a pressure intermediate said suction pressure and said discharge pressure in fluid communication with said chamber to pressure bias said first scroll member toward said second scroll member.

2. A scroll machine according to Claim 1 wherein said first and second flat portions lie in spaced parallel planes.

3. A scroll machine according to Claim 1 wherein said first and second flat portions lie in the same plane.

4. A scroll machine according to Claim 1 wherein one of said first and second annular lip seals is disposed within a seal groove.

5. A scroll machine according to Claim 4 wherein said seal groove is disposed within said first scroll member.

6. A scroll machine according to Claim 4 wherein said seal groove is disposed within said plate member.

7. A scroll machine according to Claim 4 wherein said seal groove is generally rectangular in shape.

8. A scroll machine according to Claim 4 wherein said seal groove includes a wall which defines a tapered portion.

9. A scroll machine according to Claim 4 wherein said seal groove includes a wall which defines a double tapered portion.

10. A scroll machine according to Claim 4 wherein said seal groove includes a wall which defines a reverse taper.

11. A scroll machine according to Claim 4 wherein said seal groove includes a wall which defines a reverse double taper.

12. A scroll machine according to Claim 4 wherein said seal groove includes a wall which defines a reverse lip.

13. A scroll machine according to Claim 4 wherein said seal groove includes a wall which defines a first tapered portion, a flat portion and a second tapered portion.

14. A scroll machine according to Claim 4 wherein said seal groove includes a wall which defines a curved portion.

15. A scroll machine according to Claim 1 wherein one of said first and second annular lip seals is a one-way seal.

16. A scroll machine according to Claim 1 wherein one of said first and second annular lip seals is an L-shaped seal.

17. A scroll machine according to Claim 1 wherein one of said first and second annular lip seals defines a notch.

18. A scroll machine according to Claim 1 wherein one of said first and second annular lip seals is manufactured from Teflon®.

19. A scroll machine according to Claim 1 wherein said scroll machine further comprises a vapor injection system.

20. A scroll machine according to Claim 1 wherein said scroll machine further comprises a capacity modulation system.

21. A scroll machine comprising:

a first scroll member having a first spiral wrap projecting outwardly from a first end plate;

a second scroll member having a second spiral wrap projecting outwardly from a second end plate, said second spiral wrap being interleaved with said first spiral wrap;

a drive member for causing said spiral wraps to orbit with respect to one another whereby said spiral wraps create pockets of progressively changing volume between a suction pressure zone at a suction pressure and a discharge pressure zone at a discharge pressure;

a plate member having a central portion disposed adjacent said first scroll member;

a discharge passage placing one of said pockets in fluid communication with said discharge pressure zone, said discharge passage extending through said plate member and said first end plate;

a first annular lip seal disposed between said plate member and said first end plate and surrounding said discharge passage;

a second annular lip seal disposed between said plate member and said first end plate and surrounding said first lip seal, thereby defining a first chamber between said first and second lip seals;

a third annular lip seal disposed between said plate member and said first end plate and surrounding said second lip seal, thereby defining a second chamber between said second and third lip seals; and

passages for placing fluid being compressed in fluid communication with said first and second chambers to pressure bias said first scroll member toward said second scroll member.

22. A scroll machine according to Claim 21 wherein said first and second flat portions lie in the same plane.

23. A scroll machine according to Claim 21 wherein one of said first and second annular lip seals is disposed within a seal groove.

24. A scroll machine according to Claim 22 wherein said seal groove is disposed within said first scroll member.

25. A scroll machine according to Claim 22 wherein said seal groove is generally rectangular in shape.

26. A scroll machine according to Claim 22 wherein said seal groove includes a wall which defines a tapered portion.

27. A scroll machine according to Claim 22 wherein said seal groove includes a wall which defines a double tapered portion.

28. A scroll machine according to Claim 10 wherein said seal groove includes a wall which defines a reverse taper.

29. A scroll machine according to Claim 11 wherein said seal groove includes a wall which defines a reverse double taper.

30. A scroll machine according to Claim 12 wherein said seal groove includes a wall which defines a reverse lip.

31. A scroll machine according to Claim 13 wherein said seal groove includes a wall which defines a first tapered portion, a flat portion and a second tapered portion.

32. A scroll machine according to Claim 14 wherein said seal groove includes a wall which defines a curved portion.

33. A scroll machine according to Claim 21 wherein one of said first and second annular lip seals is a one-way seal.

34. A scroll machine according to Claim 21 wherein one of said first and second annular lip seals is an L-shaped seal.

35. A scroll machine according to Claim 21 wherein one of said first and second annular lip seals defines a notch.

36. A scroll machine according to Claim 18 wherein one of said first and second annular lip seals is manufactured from Teflon®.

37. A scroll machine according to Claim 19 wherein said scroll machine further comprises a vapor injection system.

38. A scroll machine according to Claim 21 wherein said scroll machine further comprises a capacity modulation system.

39. A scroll machine comprising:

a first scroll member having a first spiral wrap projecting outwardly from a first end plate;

a second scroll member having a second spiral wrap projecting outwardly from a second end plate, said second spiral wrap being interleaved with said first spiral wrap;

a drive member for causing said spiral wraps to orbit with respect to one another whereby said spiral wraps create pockets of progressively changing volume between a suction pressure zone at a suction pressure and a discharge pressure zone at a discharge pressure;

a partition having a central portion disposed between said discharge pressure zone and said suction pressure zone;

a discharge passage placing one of said pockets in fluid communication with said discharge pressure zone, said discharge passage extending through said central portion of said partition and said first end plate;

a first annual lip seal disposed between said central portion of said partition and said first end plate and surrounding said discharge passage;

a second annular lip seal disposed between said central portion of said partition and said first end plate and surrounding said first lip seal, thereby defining a chamber between said lip seals; and

a passage for placing compressed fluid at a pressure intermediate said suction pressure and said discharge pressure in fluid communication with said chamber to pressure bias said first scroll member toward said second scroll member.

40. A scroll machine according to Claim 39 wherein said first and second flat portions lie in spaced parallel planes.

41. A scroll machine according to Claim 39 wherein said first and second flat portions lie in the same plane.

42. A scroll machine according to Claim 39 wherein one of said first and second annular lip seals is disposed within a seal groove.

43. A scroll machine according to Claim 42 wherein said seal groove is disposed within said first scroll member.

44. A scroll machine according to Claim 42 wherein said seal groove is disposed within said plate member.

45. A scroll machine according to Claim 42 wherein said seal groove is generally rectangular in shape.

46. A scroll machine according to Claim 42 wherein said seal groove includes a wall which defines a tapered portion.

47. A scroll machine according to Claim 42 wherein said seal groove includes a wall which defines a double tapered portion.

48. A scroll machine according to Claim 42 wherein said seal groove includes a wall which defines a reverse taper.

49. A scroll machine according to Claim 42 wherein said seal groove includes a wall which defines a reverse double taper.

50. A scroll machine according to Claim 42 wherein said seal groove includes a wall which defines a reverse lip.

51. A scroll machine according to Claim 42 wherein said seal groove includes a wall which defines a first tapered portion, a flat portion and a second tapered portion.

52. A scroll machine according to Claim 42 wherein said seal groove includes a wall which defines a curved portion.

53. A scroll machine according to Claim 39 wherein one of said first and second annular lip seals is a one-way seal.

54. A scroll machine according to Claim 39 wherein one of said first and second annular lip seals is an L-shaped seal.

55. A scroll machine according to Claim 39 wherein one of said first and second annular lip seals defines a notch;

56. A scroll machine according to Claim 39 wherein one of said first and second annular lip seals is manufactured from Teflon®.

57. A scroll machine according to Claim 39 wherein said scroll machine further comprises a vapor injection system.

58. A scroll machine according to Claim 39 wherein said scroll machine further comprises a capacity modulation system.

59. A scroll machine comprising:

a shell having a top, bottom and sides;

a first scroll member disposed in said shell and having a first spiral wrap projecting outwardly from a first end plate;

a second scroll member disposed in said shell and having a second spiral wrap projecting outwardly from a second end plate, said second spiral wrap being interleaved with said first spiral wrap;

a drive member for causing said spiral wraps to orbit with respect to one another whereby said spiral wraps create pockets of progressively changing volume between a suction pressure zone at a suction pressure and a discharge pressure zone at a discharge pressure;

a discharge passage placing one of said pockets in fluid communication with said discharge pressure zone, said discharge passage extending through said top of said shell and said first end plate;

a first annular lip seal disposed between said top of said shell and said first end plate and surrounding said discharge passage;

a second annular lip seal disposed between said top of said shell and said first end plate and surrounding said first lip seal, thereby defining a chamber between said lip seals; and

a passage for placing compressed fluid at a pressure intermediate said suction pressure and said discharge pressure in fluid communication with said chamber to pressure bias said first scroll member toward said second scroll member.

60. A scroll machine according to Claim 59 wherein said first and second flat portions lie in the same plane.

61. A scroll machine according to Claim 59 wherein one of said first and second annular lip seals is disposed within a seal groove.

62. A scroll machine according to Claim 61 wherein said seal groove is disposed within said first scroll member.

63. A scroll machine according to Claim 61 wherein said seal groove is generally rectangular in shape.

64. A scroll machine according to Claim 61 wherein said seal groove includes a wall which defines a tapered portion.

65. A scroll machine according to Claim 61 wherein said seal groove includes a wall which defines a double tapered portion.

66. A scroll machine according to Claim 61 wherein said seal groove includes a wall which defines a reverse taper.

67. A scroll machine according to Claim 61 wherein said seal groove includes a wall which defines a reverse double taper.

68. A scroll machine according to Claim 61 wherein said seal groove includes a wall which defines a reverse lip.

69. A scroll machine according to Claim 61 wherein said seal groove includes a wall which defines a first tapered portion, a flat portion and a second tapered portion.

70. A scroll machine according to Claim 61 wherein said seal groove includes a wall which defines a curved portion.

71. A scroll machine according to Claim 59 wherein one of said first and second annular lip seals is a one-way seal.

72. A scroll machine according to Claim 59 wherein one of said first and second annular lip seals is an L-shaped seal.

73. A scroll machine according to Claim 59 wherein one of said first and second annular lip seals defines a notch.

74. A scroll machine according to Claim 59 wherein said scroll machine further comprises a vapor injection system.

75. A scroll machine according to Claim 59 wherein said scroll machine further comprises a capacity modulation system.

76. A scroll machine comprising:

a first scroll member having a first spiral wrap projecting outwardly from a first end plate;

a second scroll member having a second spiral wrap projecting outwardly from a second end plate, said second spiral wrap being interleaved with said first spiral wrap;

a drive member for causing said spiral wraps to orbit with respect to one another whereby said spiral wraps create pockets of progressively changing volume between a suction pressure zone at a suction pressure and a discharge pressure zone at a discharge pressure;

a plate member disposed adjacent said first scroll member;

a discharge passage placing one of said pockets in fluid communication with said discharge pressure zone, said discharge passage extending through said plate member and said first end plate;

a chamber defined by said first scroll member;

a floating seal disposed within said chamber, said floating seal engaging said plate member;

a first annular lip seal disposed between said floating seal and aid first scroll member, said first annular lip seal surrounding said discharge passage;

a second annular lip seal disposed between said floating seal and said first scroll member, said second annular lip seal surrounding said first annular lip seal; and

a passage for placing compressed fluid at a pressure intermediate said suction pressure and said discharge pressure in fluid communication with said chamber to pressure bias said first scroll member toward said second scroll member.

77. A scroll machine according to Claim 76 wherein one of said first and second annular lip seals is a one-way seal.

78. A scroll machine according to Claim 76 wherein one of said first and second annular lip seals is an L-shaped seal.

79. A scroll machine according to Claim 76 wherein one of said first and second annular lip seals defines a notch.

80. A scroll machine according to Claim 76 wherein one of said first and second annular lip seals is manufactured from Teflon®.

81. A scroll machine according to Claim 76 wherein said scroll machine further comprises a vapor injection system.

82. A scroll machine according to Claim 76 wherein said scroll machine further comprises a capacity modulation system.

83. A scroll machine comprising:

a first scroll member having a first spiral wrap projecting outwardly from a first end plate;

a second scroll member having a second spiral wrap projecting outwardly from a second end plate, said second spiral wrap being interleaved with said first spiral wrap;

a drive member for causing said spiral wraps to orbit with respect to one another whereby said spiral wraps create pockets of progressively changing volume between a suction pressure zone at a suction pressure and a discharge pressure zone at a discharge pressure;

a plate member having first and second generally flat portions disposed adjacent said first scroll member;

a discharge passage placing one of said pockets in fluid communication with said discharge pressure zone, said discharge passage extending through said plate member and said first end plate;

a first annular lip seal disposed between said first generally flat portion of said plate member and said first end plate and surrounding said discharge passage;

a second annular lip seal disposed between said second generally flat portion of said plate member and said first end plate and surrounding said first annular lip seal, thereby defining a chamber between said annular lip seals;

a seal groove defined by one of said first scroll member and said plate member, one of said first and second annular lip seals being disposed within said seal groove, said seal groove having a larger diameter than a diameter of said one annular lip seal in a free state.

84. A scroll machine according to Claim 83 wherein said first and second flat portions lie in spaced parallel planes.

85. A scroll machine according to Claim 83 wherein said first and second flat portions lie in the same plane.

86. A scroll machine according to Claim 83 wherein said seal groove is generally rectangular in shape.

87. A scroll machine according to Claim 83 wherein said seal groove includes a wall which defines a tapered portion.

88. A scroll machine according to Claim 84 wherein said seal groove includes a wall which defines a double tapered portion.

89. A scroll machine according to Claim 83 wherein said seal groove includes a wall which defines a reverse taper.

90. A scroll machine according to Claim 83 wherein said seal groove includes a wall which defines a reverse double taper.

91. A scroll machine according to Claim 83 wherein said seal groove includes a wall which defines a reverse lip.

92. A scroll machine according to Claim 83 wherein said seal groove includes a wall which defines a first tapered portion, a flat portion and a second tapered portion.

93. A scroll machine according to Claim 83 wherein said seal groove includes a wall which defines a curved portion.

94. A scroll machine according to Claim 83 wherein one of said first and second annular lip seals is a one-way seal.

95. A scroll machine according to Claim 83 wherein one of said first and second annular lip seals is an L-shaped seal.

96. A scroll machine according to Claim 83 wherein one of said first and second annular lip seals defines a notch.

97. A scroll machine according to Claim 83 wherein one of said first and second annular lip seals is manufactured from Teflon®.

98. A scroll machine according to Claim 83 wherein said scroll machine further comprises a vapor injection system.

99. a scroll machine according to Claim 83 wherein said scroll machine further comprises a capacity modulation system.